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JANUARY, 1929

ENTOMOLOGICAL NEWS

Vol. XL No. 1

EZRA TOWNSEND CRESSON
1838-1926

THE AMERICAN ENTOMOLOGICAL SOCIETY

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PHILADELPHIA, PA.
THE ACADEMY OF NATURAL SCIENCES,
Logan Square

Entered at the Philadelphia, Pa., Post Office as Second Class Matter.
Acceptance for mailing at the special rate of postage prescribed for in Section 1
Act of October 3, 1917, authorized January 15, 1921.

ENTOMOLOGICAL NEWS

published monthly, **excepting August and September,** by The American Entomological Society.

Philip P. Calvert, Ph.D., Editor; E. T. Cresson, Jr., R. G. Schmieder, Ph.D., Ernest Baylis, Associate Editors; John C. Lutz, Business Manager.

Advisory Committee: Philip Laurent, J. A. G Rehn, Chas. Liebeck, J. Chester Bradley, Ph.D., Frank Morton Jones, John C. Lutz, Max Kisliuk, Jr.

The subscription price per year of ten (10) numbers is as follows:

United States and possessions . .	**$3.00**
Canada, Central and South America .	**3.15**
Foreign	**3.25**

Single copies 35 cents. Sample copies 50 cents.

ADVERTISING RATES: Full width of page. Payments in advance.
One issue, 1 in., $ 1.20, 2 in., $ 2.40, half page, $ 4.00, full page, $ 8.00
Ten issues " 11.00, " 20.00, " 35.00, " 70.00

SUBSCRIPTIONS. All remittances and communications regarding subscriptions, non-receipt of the NEWS or of reprints, and requests for sample copies, should be addressed to

JOHN C. LUTZ, 827 N. 66th ST., PHILADELPHIA, PA.

All complaints regarding non-receipt of issues of the NEWS should be presented within three months from date of mailing of the issue. After that time the numbers will be furnished only at the regular rate for single copies. Not more than two issues will be replaced gratis, through loss in transit or in change of address, unless such have been registered, at the subscriber's expense. No subscriptions accepted which involve giving a receipt acknowledged before a notary, except at the subscriber's expense.

MANUSCRIPTS AND ADVERTISEMENTS. Address all other communications to the editor, Dr. P. P. Calvert, Zoological Laboratory, University of Pennsylvania, Philadelphia, Pa.

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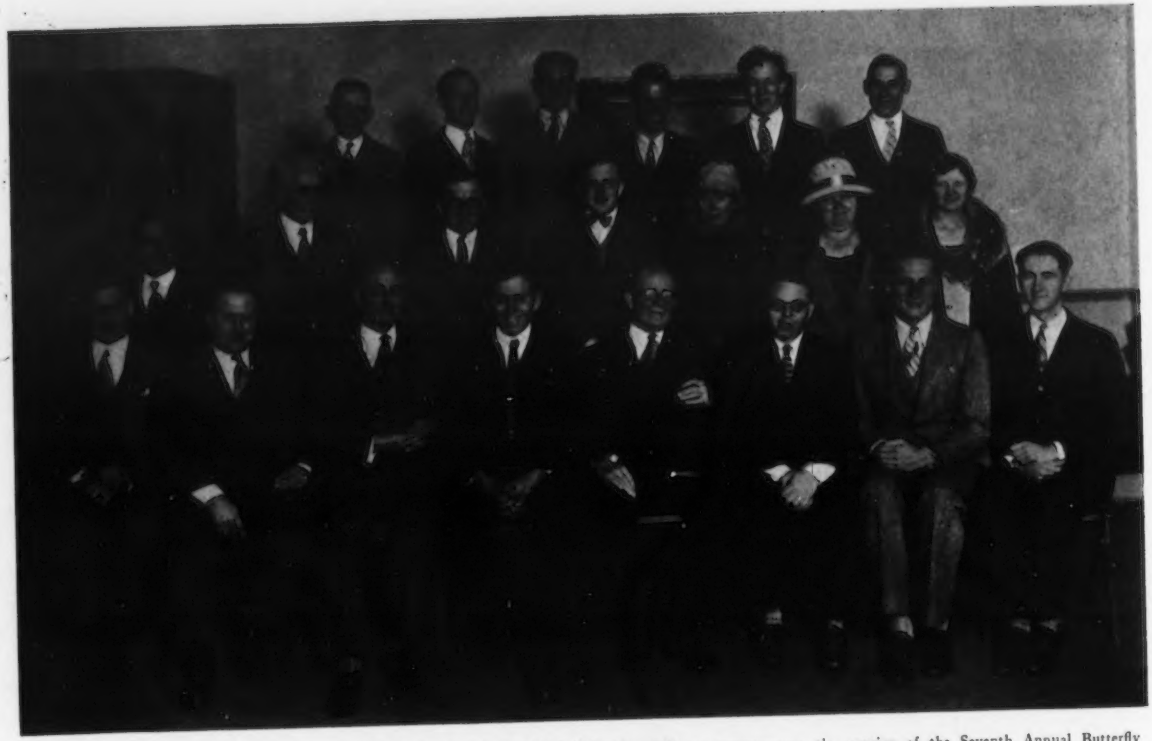


Active members of the Lorquin Entomological Society photographed Feb. 24, 1928, to commemorate the opening of the Seventh Annual Butterfly Show held at the Los Angeles Museum, Exposition Park, Los Angeles, Calif. Reading from left to right: *Top row*—RYDER, ENGHOLM, SCHLOBOHM, IVERSON, COMSTOCK JR., FRIDAY. *Middle Row*—WINGLINGER, MUCHMORE, MORAND, MINAHAN, MRS. MINAHAN, MRS. FRIDAY, MRS. ENGHOLM. *Bottom Row*—LAWRENCE KERR, J. D. GUNDER, J. A. COMSTOCK, GEO. MALCOLM, HAL NEWCOMB, CHAS. HILL, CHARLEY INGHAM, JOHN GARTH.

Active members Southern California Academy of Sciences, Los Angeles, Calif., residing from ten to fifty miles from Los Angeles Museum, Exposition Park, Los Angeles, Calif.: Reading from left to right: Miss. Friday, Mrs. Engholm. *Bottom Row*—Lawrence Keep, J. D. Gunder, J. A. Comstock, Geo. Malcolm, Hal Newcomb, Chas. Hill, Charley Ingham, John Garth. Show held at the Los Angeles Museum, Exposition Park, Los Angeles, Calif., residing from ten to fifty miles from Los Angeles Museum. *Middle Row*—Winslinger, Muchmore, Morand, Minahan, Mrs. Minahan, Mrs. Friday, Mrs. Iverson, Comstock Jr., Friday

ENTOMOLOGICAL NEWS

VOL. XL JANUARY, 1929 No. 1

The North American Sitarine Blister Beetles (Coleop.: Meloidae).[1]

By CLARENCE E. MICKEL, University of Minnesota.

Mr. Warren Knaus has recently called my attention to the fact that there is a possibility of *Leonidia anthophorae* Mickel (ENTOMOLOGICAL NEWS, 39:38-41, 1928) being the same species as *Hornia gigantea* Wellman. This possibility also occurred to me when *L. anthophorae* Mickel first came to my notice and before I wrote the manuscript describing it as a new species. At that time I examined the type of *Hornia gigantea* Wellman but dismissed the possibility of my specimens being the same as that species for the following reasons: The antennae of the type specimens of *H. gigantea* Wellman are eleven-segmented and this character has been considered diagnostic of the genus *Hornia* Riley, while the antennae of all of my specimens are ten-segmented, and ten-segmented antennae have been considered as a diagnostic character of the genus *Leonidia* Cockerell; the male type specimen of *H. gigantea* Wellman has the head distinctly wider than the thorax, so much so that Wellman stated "head almost a third wider than the pronotum", while the one or two specimens of *L. anthophorae* Mickel which I compared with the type had the head scarcely any wider than the pronotum; and the scutellum of the type specimen of *H. gigantea* Wellman is acutely angulate at the apex, while the scutellum in my specimens is roundly or bluntly angulate at the apex.

Since the description of *L. anthophorae* Mickel was published, Mr. Knaus has sent me five male specimens and eight female specimens which were all collected at Roxbury, McPherson County, Kansas, in June, 1922, and which he identified as *H. gigantea* Wellman. Upon examination I find that one male

[1] Published with the approval of the Director as Paper No. 788, of the Journal Series of the Minnesota Agricultural Experiment Station.

ENTOMOLOGICAL NEWS.
ACAD. NAT. SCI.
PHILADELPHIA, PENN'A.

specimen of this lot has the antennae eleven-segmented, two female specimens have ten-segmented antennae with a remnant of a suture on the tenth segment, while three males and seven females have the antennae definitely only ten-segmented. The specimens with the ten-segmented antennae are identical with the holotype and paratypes of *L. anthophorae* Mickel, excepting minor variations. This of course raised the question as to whether the McPherson county specimens were correctly identified as *H. gigantea* Wellman. To settle this point it was necessary to compare these specimens with the types of Wellman's species which were made available to me through the courtesy of Dr. H. B. Hungerford, University of Kansas.

Upon examination I find that the McPherson county specimen with eleven-segmented antennae is identical with the male type of *H. gigantea* Wellman. The other specimens from McPherson County and all of the specimens of *L. anthophorae* Mickel are very similar to Wellman's types with the exception of the number of segments in the antennae and the comparative widths of the head and pronotum. This result led me to suspect that possibly the material collected at the same time and place as the types might show a variation in the number of antennal segments and in the comparative widths of the head and pronotum. Dr. Hungerford has generously placed at my disposal eleven males and twelve females collected at the same time and place as the type specimens of *H. gigantea* Wellman, Gove County, Kansas, June 20, 1910 (F. X. Williams). In addition to the above material I have before me six specimens of *H. gigantea* Wellman collected at Logan County, Kansas, June 27, 1910 (F. X. Williams). Six males and four females of the Gove County material have eleven-segmented antennae, three males and five females have ten-segmented antennae, and two males and three females have the antennae more or less intermediate between a ten-segmented and eleven-segmented condition.

Since the number of the segments in the antennae, and the comparative widths of the head and pronotum have been thought to have considerable significance as diagnostic characters I have examined all of the fifty-nine specimens before me

very carefully with reference to these two characters. The following table gives the results of my examination with reference to the number of segments in the antennae:

	Specimens with antennae eleven-segmented.	Specimens with antennae ten-segmented	Specimens in which tenth antennal segment has remnant of a suture indicating possibility of eleven segments.
Hornia gigantea Wellman. Type material.	1♂, 1♀.		
Hornia gigantea Wellman. Material collected at same time and place as types	6♂, 4♀.	3♂, 5♀.	2♂, 3♀.
Hornia gigantea Wellman. McPherson County specimens determined by W. Knaus.	1♂.	4♂, 6♀.	2♀.
Hornia gigantea Wellman. Logan County specimens	1♂.	4♂.	1♂.
Leonidia anthophorae Mickel Type material		6♂, 7♀.	2♂.

Since I can find no other characters in the specimens with eleven-segmented antennae which can be used to distinguish them from those specimens with ten-segmented antennae, and since there are five male and five female specimens with antennae more or less intermediate between a definite eleven-segmented condition and a definite ten-segmented condition, it appears that the number of segments in the antennae is a variable character within a species and that it has no significance as a diagnostic character.

Wellman stated in his paper describing *H. gigantea* Wellman that his species had the "head one-third wider than the pronotum", and the male type does have the head distinctly wider than the pronotum, although by actual measurement it is only one-fifth wider than the pronotum. Some of the specimens in the type material of *L. anthophorae* Mickel have the head no wider than the pronotum. The following table gives the results of my examination of the material before me with reference to this character; the measurements were made in units of a micrometer scale in the eyepiece of a binocular microscope:

	Width of head	Width of pronotum	Excess of head over pronotum
Males, antennae eleven-segmented.			
H. gigantea Wellman, type, Gove County, Kan.	55	46	9
" " " Gove county, Kan.	54	45	9
" " " " " "	51	43	8
" " " " " "	53	47	6
" " " " " "	61	49	12
" " " " " "	47	40	7
" " " " " "	47	42	5
" " " Logan county, Kan.	57	49	8
" " " McPherson county, Kan.	56	48	8
Males, antennae ten-segmented			
H. gigantea Wellman, Gove county, Kan.	52	44	8
" " " " " "	51	44	7
" " " " " "	53	47	6
" " " " " "	56	48	8
" " " " " "	50	45	5
" " " Logan county, Kan.	59	48	11
" " " " " "	51	45	6
" " " " " "	53	48	5
" " " " " "	55	45	10
" " " " " "	57	48	9
" " " McPherson county, Kan.	54	48	6
" " " " " "	54	49	5
" " " " " "	52	48	4
" " " " " "	50	44	6
L. anthophorae Mickel, holotype	57	51	6
" " " paratype	54	49	5
" " " "	54	49	5
" " " "	49	46	3
" " " "	55	52	3
Females, antennae eleven-segmented.			
H. gigantea Wellman, type.	46	43	3
" " " Gove county, Kan.	46	42	4
" " " " " "	45	42	3
" " " " " "	49	45	4
" " " " " "	42	41	1
Females, antennae ten-segmented.			
H. gigantea Wellman, Gove county, Kan.	44	42	2
" " " " " "	46	43	3
" " " " " "	45	42	3
" " " " " "	48	47	1
" " " " " "	47	43	4

	Width of head	Width of pronotum	Excess of head over pronotum
H. gigantea Wellman, Gove county, Kan.	45	43	2
" " " " " "	46	42	4
" " " " " "	45	39	6
" " " McPherson county, Kan.	35	31	4
" " " " " "	40	37	3
" " " " " "	43	42	1
" " " " " "	41	40	1
" " " " " "	46	42	4
" " " " " "	44	40	4
" " " " " "	42	40	2
" " " " " "	42	37	5
L. anthophorae Mickel, allotype.	44	42	2
" " " paratype.	42	42	0
" " " "	35	35	0
" " " "	44	45	-1
" " " "	45	45	0

From the above data it appears that the comparative widths of the head and pronotum is a highly variable character and that it has no significance as a diagnostic character for distinguishing the species *H. gigantea* Wellman and *L. anthophorae* Mickel.

An examination of the *H. gigantea* Wellman material collected at the same time and place as the type showed that there was also a great variation in the shape of the scutellum, in some specimens being acutely angulate at the tip, in others roundly or bluntly angulate, so that the shape of the scutellum has no value as a specific or generic character. It must be concluded then, that on the basis of the above comparison *L. anthophorae* Mickel and *H. gigantea* Wellman are the same species, and the former will have to fall as a synonym.

Williams and Hungerford (ENTOMOLOGICAL NEWS, 25:1, pl. 1, 1914) have pointed out that *Hornia gigantea* Wellman has the claws armed with a long, basal spine and my examination of the type verifies this. The presence of this basal spine on the tarsal claws as described for the genus *Leonidia* Cockerell, the fact that a large number of specimens have only ten

segments in the antennae, together with the fact that the abdomen is subcorneous as in *Leonidia* Cockerell show that *H. gigantea* Wellman is much more closely related to *L. neomexicana* Cockerell, and *L. rileyi* Dugès, than it is to *H. minutipennis* Riley. In fact the only differences by which *L. neomexicana* Cockerell and *H. gigantea* Wellman can be separated is in the length and form of the last segment of the antennae and of the last segment of the maxillary palpi. On account of the variation existing in the terminal segments of the antennae of *H. gigantea* Wellman, the form and length of the terminal segment is not a valid character for separating it from *L. neomexicana* Cockerell; the same may be said regarding the maxillary palpi. An examination of the type of *L. neomexicana* Cockerell showed no other characters by which the two could be separated; therefore, *Hornia gigantea* Wellman and *Leonidia neomexicana* Cockerell must be regarded as the same species, and the former name will become a synonym since Cockerell's name has priority.

The genus *Leonidia* Cockerell was originally erected as the genus *Leonia* Dugès. The name *Leonia* Dugès was shown by Cockerell to be preoccupied by *Leonia* Gray, a genus of molluscs, and Cockerell proposed *Leonidia* to replace it. Dugès separated *Leonia* from *Hornia* on the following characters: antennae ten-segmented, prothorax cordate; elytra larger than in *Hornia;* metasternum less visible than in *Hornia;* abdomen subcorneous; claws with a long basal spine. The antennal character is a variable one, as shown above, there being ten segments in the antennae in some specimens and eleven in others; the prothorax in *Hornia minutipennis* Riley is more elongate than in *Leonidia neomexicana* Cockerell, but there is no fundamental difference in form; the elytra are slightly larger in *L. neomexicana* Cockerell than in *H. minutipennis* Riley; the metasternum is less visible, and the abdomen is more corneous in *L. neomexicana* Cockerell than in *H. minutipennis* Riley, and the basal spine on the tarsal claw is absent in the latter species.

After a comparison of representatives of the two genera, and a consideration of the differences which distinguish them, it seems to the writer that these differences are not of generic

value, that they are only specific in nature, and that the genera *Hornia* and *Leonidia* should be united as one genus, the former name having priority. Accepting this conception of the genus *Hornia* Riley, the history of the genus and its species is as follows:

GENUS HORNIA Riley.

Hornia Riley, Trans. St. Louis Ac. Sci., 3:563-565, 1877.—Wellman, Ent. News, 22:15-17, 1911.—Williams and Hungerford, Ent. News, 25:1-2, 1914.

Leonia Dugès, Insect Life, 1:211-213, 1889.—Cockerell, Psyche, 8:416, 1899.

Leonidia Cockerell, Psyche, 9:11, 1900.—Wellman, Ent. News, 22:15-17, 1911.—Mickel, Ent. News, 39:38-41, 1928.

HORNIA MINUTIPENNIS Riley.

Hornia minutipennis Riley, Trans. St. Louis Ac. Sci., 3:563-565, 1877.—Cockerell, Psyche, 8:417, 1899.—Wellman, Ent. News, 22:17, 1911.

HORNIA RILEYI (Dugès).

Leonia rileyi Dugès, Insect Life, 1:211-213, 1889.—Cockerell, Psyche, 8:416, 1899.

Leonidia rileyi Mickel, Ent. News, 39:40-41, 1928.

HORNIA NEOMEXICANA (Cockerell).

Leonia neomexicana Cockerell, Psyche, 8:416-417, 1899.

Hornia gigantea Wellman, Ent. News, 22:16-17, 1911.—Williams and Hungerford, Ent. News, 25:1-2, 1914.

Leonidia anthophorae Mickel, Ent. News, 39:38-40, 73, 1928

Leonidia neomexicana Mickel, Ent. News, 39-41, 1928.

At the End of the Season with Polistes rubiginosus (Hym.: Vespidae).

By PHIL RAU, Kirkwood, Missouri.

We are told in the wasp literature that at the end of the summer season, queens and males hatch from the nests; that the workers and the males die off, while the fertilized queens seek shelter and hibernate. This would lead one to believe that when the various forms emerge from the nest, they fly away and somehow meet those of the opposite sex from other nests

to perform the function of mating. However, we have no definite statement to this effect.

In the autumn of 1919, I had the opportunity of observing the behavior of a colony of *P. rubiginosus*. This was entirely concealed in between the outer and inner board walls of an old building, and ingress and egress was gained through a knot-hole about two and one-half inches in diameter. This opening was very conspicuous because it was surrounded by a hundred or more wasps, which just idly sat about for hours, occasionally engaging in conflicts the nature of which puzzled me. With the ubiquitous Sunday pleasure-seekers about, it was impossible on that day to solve the puzzle, so we were forced to await another opportunity to get the details of their behavior.

On September 15 I returned with the express purpose of studying the group. At dusk many of them were to be seen in the dim light around this opening in the wall, and the following morning at 8:30, masses of wasps were present, in some places three deep, clustered about this opening. At one point there was a compact cluster of about a dozen wasps, and this mass was moving as a unit, slowly walking out of the hole. When they had reached the outside, where I thought that at any moment the mass would lose its hold and drop to the ground, they slowly extricated themselves and walked back to join the throng at the margin of the hole. The sex of the wasps was noted as they walked away singly; all were males but one, which was a queen; her trim and fresh appearance indicated that she was newly emerged. This of course gave the first indication that this waiting behavior was in anticipation of mating. I have often wondered why one sees in the literature no record of the mating of *Polistes*. Furthermore, seeing adults of both *P. annularis* and *P. pallipes* clinging to the nests long after all the cells were empty has caused me to suspect that mating does not take place on the wing, but upon the nest. This of course would indicate that inbreeding occurs, and possibly it does. At least, with this hypothesis in mind, I spent a whole day in watching this mass for clues to the meaning of this behavior.

The clusters or compact knots of moving wasps appeared only at intervals. The entire waiting congregation kept its

place constantly about the hole, some on the inside and some on the outside of the wall. Sometimes these wasps would grow restless, walk a short distance and back again, or crawl over one another; occasionally one would fly out in the sunshine, and at great intervals one would return to the group on the wing, at which times the others were usually eager to gather any refreshment they could from its mouth. Sometimes some of those waiting in the crowd would get their mouths together as though effecting an exchange of saliva, and occasionally one was to be seen biting at the wood as though trying to scrape something off the surface. Since only a few, perhaps five, were seen at the golden-rod that entire morning and few were seen to leave, I decided that the majority of them must be desperately hungry, but were too lazy or too fearful of losing their place, to leave the nest and seek their own food. This was proven by the panic which was precipitated by my smearing a little apple jelly from my lunch on the wall near the opening, and later by placing a piece of ripe persimmon there. The mass of wasps at the persimmon became so thick and the struggle so intense that soon the entire mass rolled to the ground. This excitement was especially significant in consideration of the fact that under the persimmon tree scarcely fifty feet away lay similar morsels aplenty, but to these no wasps came.

As I have said, they usually waited quietly at the periphery of the opening, but I failed to make clear the prettiness of their positions. Almost all of them were facing the light; the circle of pale,* serious faces, watching so intently, through the ragged hole, was indeed a pretty sight. The chief disturbance to break the ominous silence was caused by the appearance of new ones coming down from the unseen nest above. Sometimes these new arrivals would crowd in among the throng; sometimes they would simply walk over the top of the mass until they settled into it and became a part of it.

One might easily suspect from this conduct that they were only seeking the sunshine, but in this case, this hypothesis is quickly discarded by the fact that they stopped short of actually reaching the sunshine; they persistently lingered at the hole

* Males have white faces.

here near the nest, a place where the sun could not reach them until after one o'clock. Furthermore, it was soon evident that influences other than light were at work in prompting this behavior, because they were out just the same at deep twilight and even a few were there at 9 p. m., and in the deep shadows of the morning hours. I wondered whether these might be guarding the nest, but since, when they were awakened by my lantern, they moved slowly and clumsily up toward the nest, I soon decided that they had been sleeping and not performing sentry duty.

At 8:30 a. m., I saw a second slowly moving mass come out of the opening and move downward on the outside of the wall. There was great confusion and display of emotion as the ball-like mass moved. It stopped at a point four inches below the opening, and while I was trying to decipher the meaning of it all, a fine large female extricated herself from the mass and slowly walked away. A male followed her, and a moment later another, and the two struggled for her possession while she was trying to escape; she seemed unfriendly to their advances, threateningly manipulated her sting, and eventually succeeded in breaking away, and then quickly climbed up the wall. While this was going on, the number of males had increased from two to six, and as the queen fled up the wall she left in her wake a string of six emotional suitors, who eventually returned and made their way back to the mass at the hole.

The problem of the mass of waiting wasps now began to take form; certain definite questions began to arise in my mind. As the males stand thus, two or three deep in places, all with their heads out, waiting, alert, are they quietly lingering there for new queens to emerge? Do they wait for queens which have gone out into the sunshine to return for the purpose of mating? Is it possible that queens from other nests come here? Are the queens fertilized more than one time? If inbreeding occurs, does it in any way affect the vigor or sex of the offspring?

Even as I was pondering thus I looked up and saw a pair in copulo walking over the mass of their fellow-creatures. After some seconds they accidentally severed, but in this the female showed her perfect willingness to resume the relation;

this was quite in contrast to the behavior of the first female, which threateningly used her sting in making her escape. Probably, however, this was after abundant fertilization had been effected in the case of the first.

A little later a third mass was seen; this seemed the largest yet, and from cursory examination seemed to be an all-stag affair. Male was atop male, with much agitation of the antennae and bodily movements denoting intense sexual excitement. So the struggling among the seething mass continued while as a unit it slowly moved on; their sexual excitement was wild, and their attacks even upon each other were now unmistakably of this nature. It was impossible not to suspect that somewhere within the ball was a female, yet I watched their maneuvers carefully for five minutes without being able to detect her. Suddenly she appeared on the surface, extricated herself, or really tore herself free from the teeming mass and dashed away on the wing into the sunshine. I had time only to see that her wings were badly frayed, which usually indicates age, but it was obvious that even a new queen could not have gone through this melee without being badly torn. It was interesting to observe the conduct of the mass of followers after the escape of this queen. Their movements and agitation continued the same, to such a degree that I suspected the presence of a second female among them. In this idea I was in error; the fact was that in their extreme excitement, none of the males observed her escape and in their madness none of them even missed her until long after her disappearance. To be exact, it took just three minutes for them to discover her absence, and one by one they disentangled themselves and walked solemnly back to the hole in the wall and took their places among the other watchers. The queen was gone, leaving me pondering perplexing problems; would she ever return to the nest from this first flight, or with the function of fertilization accomplished would she seek a place a place for hibernation?

In the course of the next ten minutes, there was no particular activity other than the departure on the wing of two of the males, and the return of two others from the field to the nest. This gave rise to the questions: How do these males find their way back to the home nest when once they venture out afield? Is it possible that some of the males thus wander out and return

to nests other than their own, and that the resultant mixing of the strain tends to offset the injuries of inbreeding?

As it neared noon and the temperature rose, more and more wasps ventured to the opening, and among the crowd I saw two newly-emerged queens. I knew from their fresh and unscarred condition that they were young, but since the males paid no attention to them, I thought that perhaps they were only newly-emerged workers of large size or newly hatched queens which were physiologically too immature for mating. While the males paid no attention to these two, which looked every bit as though they were queens (and at that date one would suspect all newly emerged adults to be either queens or males), an incoming queen just at that time precipitated the greatest commotion of the morning. As this queen alighted she gathered a group of males about her which, like a rolling snow-ball, increased in size as the mass slowly moved while clinging with many legs to the wall. With legs in motion, antennae moving, abdomens pulsating and all the wasps struggling pell-mell, the mass looked like a tangled ball of twine. The weight of the cluster was too great, and after a few seconds the whole mass fell to the ground below. For six minutes the same struggle continued on the ground, when slowly one by one they freed themselves and either flew or walked up the wall to the nest, leaving the contest to the last three, two males and one queen. All told, this lot contained fourteen individuals, three females and eleven males. The behavior of the two younger females in the lot was difficult to explain; their very entry into the struggle was not due to mob psychology, or a "follow-the-crowd" attitude, but was probably deliberate, for on another occasion a little later, when a group of three males and one queen were in the struggle for copulation about four inches below the opening in the wall, a second queen, likewise a wall-flower and unsought, left the group by the opening and walked down to the scene of commotion four inches below and joined in the competition.

This behavior continued all day, in sunshine or in shade; even at twilight at 6:20 p. m., a mass of twelve, in all of their excitement fell to the ground, and even when it was nearly dark they extricated themselves and flew or walked back to the group at the hole in the wall.

Thus one sees that their behavior at this time teems with emotion, that they indulge in likes and dislikes, and that light, heat and darkness are not primary influencing factors in this conduct.

That these males occasionally fed at the flowers during their sojourn here was actually observed. Two wasps from this colony were seen refreshing themselves at the goldenrod below the nest. Since they so seldom leave the mass, however, I suspect that their meals are few and far between, and that the great majority of them are ravenously hungry most of the time. This was indicated by their onslaught upon the jelly and persimmon placed near enough for them to get it without leaving the spot where they kept eager and incessant watch. Frequently also a returning male created much excitement, but I could not tell whether this was because they suspected it to be a female or whether it had some food or nectar about its face.*

I have data to show that in the laboratory the male *Polistes pallipes* also remains on the nest long after emergence, and observations show that the same is true for them in nature, although the length of time that they linger there is not accurately known. Their food problem also, under these circumstances, is of interest. On one nest of *P. pallipes* in autumn, I observed, among four workers and two males, that a worker and one male appeared to be "kissing" each other to so prolonged an extent that I suspected that the male was imbibing some food from the mouth of the worker. In fact, this worker was for the same reason attractive to others, for soon a second male pushed the first one aside and secured for himself the treat, whatever it may have been, from the lips of the worker. Presently a second worker (or possibly it was the queen) forcibly pushed both of these aside, put her own lips to those of the popular one and repeated their performance. From my position I could not actually see any substance pass from the mouth of one to the other, but the evidence seemed to justify my strong suspicions in the case.

* The second year this behavior was repeated at the same place, and elsewhere I show that on the warm days in February the same hole in the wall harbored many queens. They probably hibernated in the space between the two walls, or came back to their childhood home for nest-building, having retained memory of it.

Hancock's Studies of Inheritance in Green and Pink Katy-Dids, Amblycorypha oblongifolia DeGeer (Orthop.: Tettigoniidae).

By ROBERT K. NABOURS

Kansas State Agricultural College and Agricultural Experiment Station, Manhattan, Kansas.

In the ENTOMOLOGICAL NEWS, Vol. xxvii, pp. 70-82, the late Dr. Joseph Lane Hancock, of Chicago, gave a preliminary account of his extraordinary experiment in crossing a male green Katy-did with a pink female of the species *Amblycorypha oblongifolia*. There is an historical sketch, an account of the finding of the pink female and a description, in considerable detail, of the methods of breeding and the general biology of these Katy-dids. Then there is a summary, in part as follows:

1. A green male was mated to the pink Katy-did, and the eggs were oviposited in the summer of 1912. Hancock was the first to observe that the females of this species oviposited in the ground. He was also first to discover that some of the eggs required two, and others three years before hatching.

2. There were thirteen F_1 progeny, eight pink and two green hatched two years (1914), and one pink and two green hatched three years (1915) after the eggs had been oviposited, a ratio of 9 pink: 4 green. There were approximately as many males as females.

3. In June, 1914, four pairs of the F_1 pink, and one pair of the green Katy-dids were mated. Three of the pink and the one green female oviposited in the ground of their respective cages late in the summer and early autumn.

4. In the summer of 1915, a green female, of the one pink and two green individuals which hatched that year from the 1912 mating, was mated to a green male from the field. Later in the summer she oviposited.

5. Hancock concluded that the pink color, as well as the green, was hereditary, and that the idea of these colors in Katy-dids being dependent on the absorption of the coloring matter taken in with the food was erroneous.

At the time of the publication of this paper, February, 1916, Hancock was looking forward to the hatching of the F_2 progeny in the summers of 1916, 1917 and 1918.

THE F_2 AND F_3 PROGENY FROM THE FURTHER BREEDING OF THE OFFSPRING OF THE GREEN x PINK MATING OF 1912.

Circumstances prevented Dr. Hancock from publishing his further observations and records. On January 5, 1919, the main results were wrtten down as Dr. Hancock verbally related them to me. Since his death Mrs. Hancock has generously furnished his complete notes, composing more than forty typewritten pages of the unpublished part of the observations and experimental results.

Most of the notes refer to observations of the habits of the Katy-dids such as feeding (they were cannibalistic to some extent), mating, ovipositing, hatching of the offspring, growth, molting, effects of temperature and moisture, and enemies (mostly spiders). The males were much less viable than the females. They ate best a mint common in the region of Lakeside, Michigan, where the experiment was carried on. Among the green ones, the males were yellowish green while the females were bluish green. Among the pink individuals the males had a touch of yellow while the females were bluish red. There were some variations in patterns. One male had strikingly blacker hind tibia than the others. Some had the thorax marked with a black line on each side which was in contrast with others.

Beginning where Dr. Hancock left off (loc. cit.), the one pair of F_1 green individuals gave 21 all green offspring in 1916, and two green ones in 1917 (see diagram p. 16). The one surviving F_1 green female which hatched in 1915, mated to a male from the fields, gave 58 all green ones in 1917, and "A number of green young with no pink", in 1918. From the three F_1 pink females, mated to pink brothers, in 1914, 32 green and 75 pink individuals were hatched in 1916; six green and fifteen pink were hatched and recorded in 1917, making a total F_2 progeny of 38 green: 90 pink. Several of the F_2 pink males and females of the 1916 hatching were inbred, and they gave 35 green and 209 pink in 1918, and 1 green and 1 pink in 1919 (see diagram p. 5). Obviously, among the parents of the F_3 progeny there were some which were homozygous for pink.

Hancock states that he bred green males and females, from the field, aside from the green x pink stock, as controls, and

that they were parallel in respect to the two-and three-year periods required for the eggs to hatch, and all the progenies were green.

Miss Isabel Potter has aided in checking the figures used with Dr. Hancock's notes.

CONCLUSIONS.

1. The eggs of the Katy-did, *A. oblongifolia,* oviposited in the ground in the late summer and early autumn, hatch in the early summer, some of them two, and others three years afterwards.

2. Since the green individuals bred true consistently, and the F_1 pink males and females gave green and pinks in F_2 in a ratio of 38:90, it appears that the green and pink of *A. oblongifolia* compose a pair of Mendelian characters, with the pink color dominant. The original pink female parent was heterozygous for pink and green, respectively.

3. The assiduousness of Dr. Hancock in carrying out this most arduous experiment, over a period of seven years, will be appreciated and admired by all.

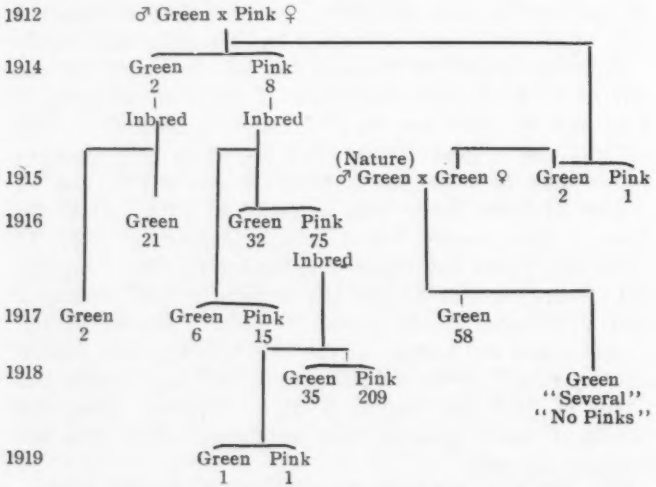


Diagram Showing the Inheritance Results from the Crossing of a Green Male Katy-did with a Pink Female Katy-did (*Amblycorypha oblongifolia*). From the notes of Dr. Joseph Lane Hancock. (There were approximately equal numbers of males and females.)

On Three New Spiders of the Genus Oxyopes (Araneina).

By RALPH V. CHAMBERLIN,
University of Utah.

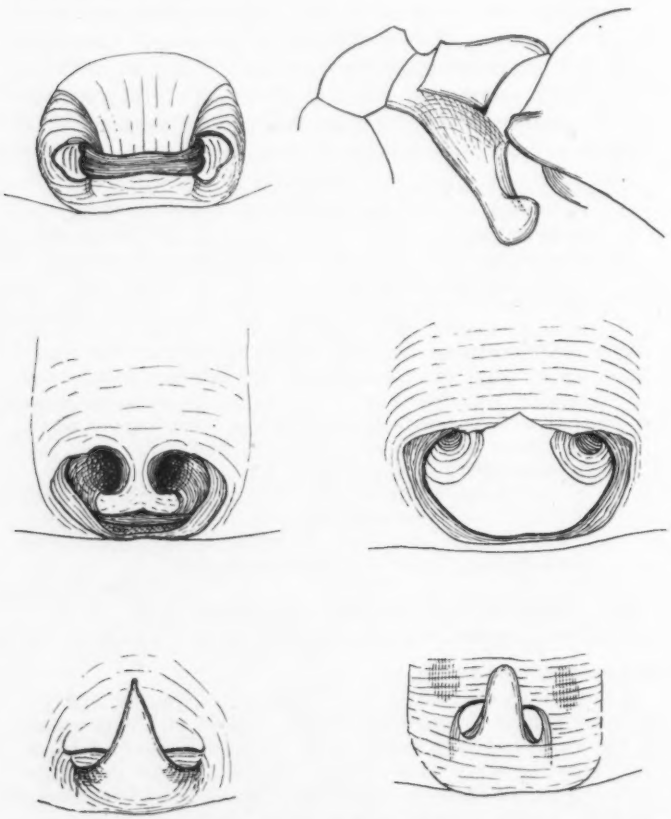
The three new species of *Oxyopes* here described were noted in the course of a study of material in the Cornell University collection, where the types are deposited. They are described through the courtesy of Prof. C. R. Crosby. They may be placed with reference to the commoner North American species by means of the following key to females.

a. Femora of legs lined with black beneath.
  b. Epigynum with a pronounced, forwardly-directed, distally acute process (fig. 5).....*O. salticus* Htz.
  bb. Epigynum with no such forwardly-directed process.
    c. Spermathecal openings not widely separated; the transverse caudal ridge or plate with its anterior margin obtusely angular at middle (fig. 3)...*O. acleistus* n. sp.
    cc. Spermathecal openings widely separated; the transverse ridge farther forward, its anterior margin not angular at middle (fig. 1).....*O. aglossus* n. sp.
aa. Femora of legs without longitudinal black lines beneath.
  b. Epigynum with a conspicuous, forwardly-directed, apically rounded process or finger.
    c. Line of cephalothorax seen in profile nearly straight; finger of epigynum narrower (fig. 6)...*O. scalaris* Htz.
    cc. Line of cephalothorax in profile rising decidedly in head region; finger of epigynum broader
      O. rufipes Banks
  bb. Epigynum with no such conspicuous finger, at most obtusely angular in front (fig. 4).....*O. helius* n. sp.

Oxyopes aglossus n. sp.

♀.—Coloration much as in *O. salticus*. Carapace with integument yellow, or brownish yellow, clothed with dark scales on the sides and with white scales on middle band, a black line extending from each anterior lateral eye and down the front face of the chelicera, the lateral margins lined with black. Sternum yellow, typically with marginal black dots. Legs yellow, the femora each with a ventral black line and often some small scattered black spots on coxae, femora, patellae and tibiae, especially at bases of the spines. Abdomen dorsally light yellowish grey or somewhat silvery, sides brown with darker maculations, the venter with a median black band between

epigynum and spinnerets, this band often broken into spots. Characterized especially by the form of the epigynum which presents a strongly chitinized transverse plate behind a cavity, bearing no forwardly-directed process or finger. (Fig. 1.) Length, 6 mm.



1 Epigynum of *Oxyopes aglossus* n. sp. 2 Lateral view of portion of right palpus of male of *Oxyopes aglossus* n. sp. showing tibial apophysis. 3 Epigynum of *Oxyopes acleistus* n. sp. 4 Epigynum of *Oxyopes helius* n. sp.
5 Epigynum of *Oxyopes salticus* Hentz. 6 Epigynum of *Oxyopes scalaris* Hentz.

♂.—Coloration in general as in the female. Palpi darkened, the tarsus and palpal organ black or nearly so. The abdomen, which is more slender and pointed than in the female, with dorsal light band narrower, pointed behind, commonly enclosing a dark, subsagitate area anteriorly. Tibia of palpus with a low, dorso-ectal angular process as in *salticus* but with ventral process of the form shown in fig. 2. The cymbium posteriorly cornuate, but the process rather small, rounded, and close to the tibia. Length, 4 mm.

Localities.—Georgia: Okefenokee Swamp, Billy's Id. (C. R. Crosby, June, 1912), Honey Id. and Mixon's Hammock; Tennessee: Beersheeba (one ♂, Fox Coll., June, 1888); Louisiana: Chestina (2 ♂, K. R. Schmidt, May, 1915). *Holotype,* a female, and *allotype* from Billy's Id.

Likely to be confused with *salticus* because of the similar lineation of the legs but easily distinguished by the very different epigynum. The male is most easily distinguished by the larger, differently formed ventral apophysis of the tibia of the palpus (fig. 2). The posterior process of the cymbium is shorter and less salient than in *salticus.*

Oxyopes acleistus n. sp.

♀.—Color pattern of this species also suggesting that of *salticus.* The vertical black lines down clypeus are broader, extending over space between anterior median and anterior lateral eye on each side, narrowing from eyes gradually to edge of clypeus. Black lines along antero-ventral face of femora wider, often with edges irregular; a broader band along ventro-caudal face mostly broken into spots; a stripe along antero-dorsal face complete on first legs but on third and fourth legs showing only distally; the stripes on femora tending to spread laterally and to unite with each other distally. Median dorsal light area of abdomen enclosing a dark sagittate mark; sides dark, and venter with the usual median longitudinal dark band. The spermathecal openings not concealed; caudal rim of epigynum angled at middle but with no forwardly-directed finger (fig. 3). Length, 6 mm.

Locality.—Florida: Stanford (1 ♀ taken by Stone, 27 July, 1927).

Oxyopes helius n. sp.

♀.—Contrasting with the two preceding species in showing no longitudinal dark lines on the femora of legs; these are dusky with a tendency to show a paler annulus at middle and at distal end; patellae and tibiae also dusky; posterior legs

paler than the anterior. Clypeus and chelicerae with no vertical black lines, the clypeus with three sub-vertical lines of white hair, a median one and a lateral one on each side from between posterior lateral and anterior lateral eyes to ventro-lateral corner. Sternum and coxae of legs yellow, not spotted. Light area of dorsum subdivided by a median brown line which sends off oblique lines on each side behind; sides very dark; mid-ventral band broad but not so deeply colored as the sides. The cephalothorax is very high in front of the posterior declivity, the dorsal line in profile a little convex. The epigynum presents a marginal rim laterally and caudally which is narrower behind than in other species and presents neither median tooth nor finger from the rim (fig. 4). Length, 5 mm.

Locality.—Georgia: Okefenokee Swamp, Mixon's Hammock (Crosby coll., 16 June, 1912). 1 ♀ taken from a nest of *Pelopocus*.

The epigynum of this species separates it at once from other species. The abdomen is proportionately broader and shorter than usual, and the caudally high, broad cephalothorax is also characteristic.

A New Riodinid from Louisiana (Lepid.).

By W. J. HOLLAND, Carnegie Museum, Pittsburgh, Pennsylvania

Calephelis louisiana n. sp.

Upper side:—The prevalent color of the wings is dull brown, interrupted on the fore wing by a band of dark luteous, which extends from the base parallel with the costa to the outer margin; a similarly colored light transverse band crosses the hind wing about its middle, parallel to the outer margin, sending an outward ray-like projection about its middle toward the outer margin. The thorax and abdomen on the upper side are concolorous.

Under side:—The ground-color of this side of the wings is pale red, much paler than in *C. virginiensis* Gray, and in tint like that of *C. perditalis* B. & McD. The metallic spots and dark markings disposed much as in *C. virginiensis* and *C. borealis*, but with the post-median band of metallic spots relatively larger, and widening toward the costa of the fore wing, in certain lights showing dark reflections. Thorax and abdomen on the under side concolorous. Legs testaceous; tibiae whitish. Expanse: .75 in.

Type (♂) in the Holland Collection, taken at Opelousas, Louisiana, by G. R. Pilate.

Hoplothrips karnyi Hood (Thysanoptera).

By DUDLEY MOULTON,
San Francisco, California.

Numerous specimens of this interesting *Hoplothrips* have been forwarded to me for identification during the last two years, with host plant, locality and collector records as follows: "Tree fungus", Newark, New Jersey, (Wm. Trager), *Chrysanthemum leucanthemum*, Hamden, Connecticut, (W. E. Britton), Northern Spy Apple, Fair Haven, Vermont, (H. N. Bean), Fungus on dead Beech stump, Kingsville, Ohio, (J. C. Pallister), Fungus on dead log, Cold Spring Harbor, Long Island, (H. Friedman), under bark, Amherst, Massachusetts, (A. H. Salmon), on cherry and peach stumps, Indianapolis, Indiana, (H. F. Dietz), under bark of cherry tree, Brooklyn, New York, (W. E. Smith).

The confusion that has arisen in the proper identification of this species has been brought about partly because there are two distinct forms of male, and a noticeable variation in size of the female. Dr. H. Priesner, of Austria, has given the name *oedymer* for male specimens having greatly enlarged prothorax and forelegs, and *gynacoid* for those having prothorax and forelegs normally developed. I have recently named a species in another genus, *Haplothrips biformis*, from Abyssinia, Africa, which shows the same type variation.

I have selected eighty ♀ ♀ for the purpose of comparison and measurement from among the collections above listed, 48 macroptera, 32 brachyptera and 34 ♂ ♂, 5 macroptera *gynacoid*, 5 brachyptera *gynacoid* and 24 brachyptera *oedymer*, Macroptera *oedymer* forms have not been observed in this species. Macropterous males are equally as common as brachypterous males in the *oedymer* form of *Haplothrips biformis*, Moulton.

There is a marked variation in total body length, from 2 mm. to 4 mm., especially among the females, with prevailing size 2.5 to 3.5 mm. Much of this variation is due to a contracted or distended condition of the abdomen. The connecting tissue between the segments in a distended specimen is as long,

if not longer, than the tergites themselves, while in a contracted specimen the segments are more or less telescoped, connecting tissue is folded and largely concealed and length of abdomen is much less than half of that in a normally distended specimen.

All of the characters which have been used heretofore in an attempt to designate two different species are insufficient, and are overcome by the normal variation within the species itself when we recognize the *oedymer* and *gynacoid* forms.

HOPLOTHRIPS KARNYI Hood.

Trichothrips karnyi Hood, Insecutor Inscitiae Menstruus, ii, No. 2, 20, 1914.

Trichothrips karnyi major Hood, Proc. Biol. Soc. Wash., xxvii, 153, 1914.

Trichothrips karnyi karnyi Hood, Proc. Biol. Soc. Wash, xxvii, 153, 1914.

Hoplothrips karnyi major Hood, The Ent., xlviii, 105, 1915.

Hoplothrips karnyi karnyi Hood, Insec. Insc. Mens., v, Nos. 4-6, 61, 1917.

Trichothrips drakei Watson, Bull. Brooklyn Ent. Soc., xvi, 78, 1921.

Trichothrips ulmi Weiss & Lott, Bull. Brooklyn Ent. Soc., xviii, 94, 1923.

Hoplothrips major Weiss, Ent. News, xxxvii, 84, 1926.

Hoplothrips major Hood, Ent. Americana, vii, 226, 1927.

Hoplothrips karnyi major Hood, Ent. News, xxxviii, 113, 1927.

The Choice of Bees by Absolute or Relative Characteristics (Hymen.: Apidae).

In the great majority of experiments made by Köhler upon chicks, the chick's choice between two shades of grey was determined by the *relative* characteristics of the training brightness. Bees if trained to choose with regard to the difference of two shades of greys determine their choice by the *absolute* brightness of the training paper. If in a transference in positive direction the training paper remains visible, they go to that paper as before; if in a transference in negative direction the training paper is absent, they do not choose the paper that has the same relative place in the new combination as the training paper had in the old one, but sit down about equally on both papers and in a smaller number than they did when the training paper was present. J. A. BIERENS DE HAAN (in *Tijdschrift der Nederlandsche Dierkundige Vereeniging* (3) I, 2, Leiden, Sept., 1928).

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., JANUARY, 1929.

On the Accrediting of Illustrations.

When a man, like C. V. Riley for example, with a genius for illustration, worked industriously to produce a striking and extremely competent drawing, he was naturally rather proud of it, and he expected and deserved scientific credit for his work. Riley was very insistent on this point, and his wonderful illustrations in the famous Missouri Reports have been used again and again in bulletins and books by other authors. Owing to Riley's original insistence, the credit has almost invariably been given to him, whoever the author of the article or book in which the illustration has been used. After he left Missouri and came to Washington, he did comparatively little personal drawing, but he trained George Marx and Lily Sullivan, and the early drawings of these two were done under his eye and under his constant and severe criticism.

Since the use of photography for insect illustration has come in very generally—and it was first used most successfully by Slingerland—there has been a reduction in the number of original drawings; but nevertheless many skilled draftsmen of entomological subjects have appeared. It is generally understood that an illustration should be accredited to the author of the paper which it originally illustrated, and this should be the careful aim of all writers. I think that this idea is universally accepted. In later years, however, there has been an output of bulletins and books in extraordinary number. In spite of the new photographs and new drawings, old figures have been used again and again. In the course of this use and reuse, the original source of many of these illustrations has been, through lack of care, disregarded, and later works using some of these illustrations for the second or third or tenth time credit the illustration to the second or third or ninth author in whose publication they appeared.

My early years with Riley, perhaps, cause me to notice this fact more quickly than do others, and to feel more keenly about it; and I am wondering whether it is too late to correct this tendency. We are very careful in matters of scientific credit in other directions. Should we not be equally careful in this? Some day, perhaps, some careful and inquisitive bookworm will look into this illustration credit and will prepare for publication a list that will suprise many of us and cause some authors who have been a bit careless in this direction a certain amount of chagrin.—L. O. HOWARD.

Personal.

Dr. E. D. Ball has been appointed Dean of the College of Agriculture and Director of the Experiment Station, of the University of Arizona, at Tucson, Arizona.

Must "Konowia" be Discontinued?

Dr. L. O. Howard has sent to the Editor of the NEWS some correspondence he has lately had with Herr Fritz Wagner, of Vienna, publisher of *Konowia*. Herr Wagner writes from Haizingergasse 4, Wien XVIII, in part as follows: It is a question of to be or not to be with *Konowia*, the continuation of which is seriously questioned. Up to the present time I have endeavored to meet the expense of *Konowia* out of my own pocket, but the deficit has now reached an amount (3200 Austrian shillings or $500) which renders it impossible for me to make further sacrifices and I see myself before the alternative either to apply for aid to some well-to-do entomologists or scientific institutions or to discontinue publication. The latter would certainly be regrettable, as *Konowia* is the only German journal dealing neither with Coleoptera nor Lepidoptera. All attempts to obtain some financial aid in this city have been unsuccessful, because our country is too poor, and there is no other way left to me than to apply to foreign countries to ask for help in the interest of *Konowia* and of the science in general. It is pretty certain that the present deficit can never be covered by the relatively small number of subscribers, if no helpers are found who, by special contributions of larger sums, will balance this deficit and enable *Konowia* to start life over again. (Translated from the original German and condensed.)

List of the Titles of Periodicals and Serials Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annals of the Carnegie Museum. Pittsburgh, Pa.
4. Canadian Entomologist. London, Canada.
5. Pysche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology. Concord, N. H.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Entomologische Zeitschrift. Frankfurt a. M., Germany.
15. Natural History, American Museum of Natural History. New York.
16. American Journal of Science. New Haven, Conn.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Internationale entomologische Zeitschrift. Guben, Germany.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Laboratorio di Zoologia generale e agraria della R. Scuola superiore d'Agricultura in Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
26. Entomologischer Anzeiger, hersg. Adolf Hoffmann. Wien, Austria.
27. Bolletino della Società Entomologica. Genova, Italy.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. The Maine Naturalist. Thornaston, Maine.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janiero. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Transactions of the Entomological Society of London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chileña de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
48. Wiener entomologische Zeitung. Wien, Austria.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte, hrsg. v. E. Strand. Berlin.

53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Compareé. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.
56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Berlin.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Comptes rendus hebdoma. des séances de l'Académie des sciences. Paris.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie. Leningrad, USSR.
73. Quarterly Review of Biology. Baltimore, Maryland.
74. Sbornik entomolog. národniho musea v Praze. Prague, Czechoslavokia.
75. Annals and Magazine of Natural History. London.
76. The Scientific Monthly. New York.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
81. Folia myrmecol. et termitol. hrsg. Anton Krausse. Bernau bei Berlin.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
86. Zoologica, New York Zoological Society. New York.
87. Archiv für Entwicklungs mechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
96. La Cellule. Lierre, Belgium.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.

[*Konowia* is a journal of taxonomic entomology excluding the two orders mentioned above. It publishes about 20 sheets of letter press, with figures and plates, each year, the subscription price being 12 Gmk. Perhaps those entomologists in the United States who know and use *Konowia* can suggest directly to Herr Wagner, or to Dr. Howard, some means by which this useful journal may be saved and re-established.—EDITOR.]

Entomological Literature

COMPILED, WITH THE ASSISTANCE OF "BIOLOGICAL ABSTRACTS," UNDER THE SUPERVISION OF E. T. CRESSON, JR.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers **within brackets** [ ] refer to the journals, as numbered in the list of Periodicals and Serials published in the January and June numbers (or which may be secured from the publisher of Entomological News for 10c), in which the paper appeared. The number of, or annual **volume**, and in some cases the part, heft, &c. the latter **within** ( ) follows; then the pagination follows the **colon** :

All continued papers, with few exceptions, are recorded only at their first installments.

*Papers containing new forms or names have an * preceding the author's name.

(S) Papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

☞ *Note the change in the method of citing the bibliographical references, as explained above.*

Papers published in the Entomological News are not listed.

GENERAL.—Britton, W. E.—The Fourth International Congress of Entomology. [12] 21: 651-661, ill. **Fulton, B. B.**—Sound perception by insects. [76] 1928: 552-556. **Heikertinger, F.**—Wie ordnet der spezialist gattungen und arten nach einem natürlichen system? [79] 14: 129-150. **McAtee, W. L.**—A two-word code of nomenclature. Stability in nomenclature. [10] 30: 150-151; 151-152. **Myers, J. G.**—Insect exploiters of animal secretions. A chapter of insect behavior. [19] 23: 157-173. **Poos, F. W.**—An annotated list of some parasitic insects. [10] 30: 145-150. **Schwarz, E. A.**—Obituary. [68] 68: 443. **Turner, H. J.**—Nomenclature. [21] 40: 164-165. **Wainwright, C. J.**—Mr. Charles H. T. Townsend's descriptions. A protest. [48] 45: 96-99. **Watson, J. R.**—Effect of the hurricane on the abundance of some insects. [39] 12: 40-41, ill. **Williams, C. B.**—Collected records relating to insect migration. [36] 76: 79-91.

ANATOMY, PHYSIOLOGY, ETC.—Abbott, C. E.—Some experiments on the nervous physiology of dragon-fly larvae. [5] 35: 182-185. **Cappe de Baillon, P.**—Embryogenie teratologique chez les Phasmides. (Menexenus semiarmatus et Clitumnus artemis.) [78] 62: 378-387, ill. **Legendre, M. J.**—Psychologie animale.—La psychologie de Culex pipiens. [69] 187: 774-776. **Lévy, R.**—Fonctionnement du vaisseau dorsal de la larve de mouche en milieu artificiel. [69] 99: 1482-1485. **Maziarski, S.**—Sur le tissu musculaire des insectes. II. Les éléments contractiles dans les couches musculaires du tube digestif des Tipulines. [Bull. Acad. Polonaise des Sci.] 1927, B: 785-822, ill. **Sikes, E. K.**—The external morphology and life-history of the coccid bug, Orthezia urticae. [93] 1928: 269-305, ill. **Snodgrass, R. E.**—The mind of an insect. [Smiths. Report] 1917: 387-416, ill. Morphology and evolution of the insect head and its appendages. [Smith. Misc. Coll.] 81: 1-158, ill. **Weyer, F.**—Untersuchungen über die Keimdrüsen bei Hymenopterenarbiterinnen. [94] 131: 345-501, ill.

ARACHNIDA AND MYRIOPODA.—Crosby & Bishop.—Revision of the spider genera Erigone, Eperigone and Catabrithorax (Erigoneae). [N. Y. State Mus. Bull.] 1928: 5-96, ill. **Hodson, W. E. H.**—The bionomics of the bulb mite, Rhizoglyphus echinopus. [22] 19: 187-200, ill. **Seeley, R. M.**—Revision of the spider genus Tetragnatha. [N. Y. State Mus. Bull.] 1928: 99-150, ill.

THE SMALLER ORDERS OF INSECTS.—*Carpenter, F. M.—A new Protodonatan from the Grand Canyon. [5] 35: 186-190, ill. ***McDunnough, J.**—Ephemerid notes with description of a new species. [4] 60: 238-240. **Stitz, H.**—Die Neuropteren des arktischen Gebietes. [Fauna Arctica, Jena] 5: 636-638.

ORTHOPTERA.—Ramme, W.—Die Orthopteren des arktischen Gebietes. [Fauna Arctica, Jena] 5: 641-646. ***Hubbell & Walker.**—A new shrub-inhabiting species of Schistocerca from Central Florida. [Oc. Pap. Mus. Zool.] 197: 1-10, ill. **Uvarov, B. P.**—Locusts and their control. [Nat. Hist. Mag.] 1: 298-306, ill.

HEMIPTERA.—*Ball, E. D.—A supplemental review of the genus Ophiola (Conosanus) in N. A. (Cicadellinae.) [19] 23: 185-190. **Blatchley, W. S.**—The Mexican chicken bug in Florida. [39] 12: 43-44. ***Drake, C. J.**—Some Tingi-

tidae (Heteroptera) from Honduras. [Oc. Pap. Mus. Zool.] 190: 1-5, ill. ***Drake & Harris.**—Concerning some North American water-striders with descriptions of three new species. [43] 28: 269-276, ill. **Ferris, G. F.**—Observations on the Chermidae (Homoptera). Part V. (S). [4] 60: 240-245, ill. ***Hungerford, H. B.**—Some South American Corixidae. [19] 23: 174-180, ill. ***Knight, H. H.**—New species of Labopidea and Macrotyloides (Miridae). [4] 60: 233-236. ***Myers, J. G.**—Some Cuban Cicadidae, Cercopidae and Membracidae.—A correction. [5] 35: 190. **Myers, J. G.**—The morphology of the Cicadidae. [93] 1928: 365-472, ill. ***Schmidt, E.**—Die Cicadellinen des Stettiner museums. (S). [48] 45: 53-90. **Watson, S. A.**—The Miridae of Ohio. [Ohio Biol. Sur.] 4: 3-43, ill.

LEPIDOPTERA.—***Dyar, H. G.**—Notes on cactus moths allied to Melitara, with two new genera and one new species. [10] 30: 133-137. ***Walter, E. V.**—Some new moths from Arizona. [10] 30: 137-41. ***Dyar, H. G.**—Description of a new genus. [10] 30: 138. **Eltringham, H.**—On the abdominal glands in certain North American Argynnids (Nymphalidae).]36[76: 97-99, ill. ***McDunnough, J. H.**—A new Euphydryas. [4] 60: 248-249. **Philpott, A.**—On the systematic position of Anomoses (Homoneura). [36] 76: 93-96, ill. **Stichel, H.**—Die Veröffentlichungen über Erycinidae von A. Seitz im spiegelbild der kritik (Rhopal.). [11] 1928: 146-160, cont.

DIPTERA.—Aldrich, J. M.—Notes on synonymy of Diptera. [10] 30: 142-145. **Balduf, W. V.**—Notes on the habits of Aphiochaeta aletiae. [43] 28: 237-245, ill. ***Brues, C. T.**—A new species of Coniceromyia from Cuba (Phoridae). [5] 35: 157-159, ill. **Brues, C. T.**—Some Cuban Phoridae which visit the flowers of Aristolochia elegans. [5] 35: 160-161. ***Curran, C. H.**—Revision of the American species of Archytas (Tachinidae). [4] 60: 249-256, ill., cont. ***Mann, W. M.**—II. A new Microdon from Panama. [5] 35: 168-170. ***Taylor, R. L.**—A new species of Lonchaea (Lonchaeidae). [19] 23: 191-194, ill.

COLEOPTERA.—Arrow, G. J.—Polymorphism in horned beetles. [36] 76: 73-77, ill. ***Barber, H. S.**—I. A new Bolivian silvanid beetle from the myrmecodomatia of Cordia. [5] 35: 167-168. ***Benick, L.**—Amerikanische Steninen (Staph.). [4] 60: 33-52, ill. ***Blake, D. H.**—A new species of Luperodes from Mt. Mitchell, North Carolina.

[19] 23: 183-184. ***Bruch, C.**—Descripción de dos estafilinos nuevos. (S). [Bol. Acad. Nac. Cien. Rep. Argentina.] 29: 415-418, ill. **Bruch, C.**—Suplemento al catálogo sistemático de los Coleópteros de la República Argentina. III. (Addenda, Corrigenda y lista de especies.) [Bol. Acad. Nac. Cien. Rep. Argentina] 29: 419-452. ***Fall, H. C.**—New Plastoceridae and a new Cebrio. [5] 35: 139-146. **Grossman, E. F.**—Resumption of egg-laying by hibernated cotton boll weevils (Anthonomus grandis). [39] 12: 33-38, ill. ***Hopping, G. R.**—New Cerambycidae. [4] 60: 246-247. **Keler, S.**—Fossile borkenkäfer und bemerkungen über die Phylogenie der gruppe [Bull. Ent. Pologne.] 6: 216-225. **de Lapouge, G.**—Les Céroglosses. (S). [Misc. Ent.] 41, no. 4: 3-8. **Noskiewicz & Poluszynski.**—Embryologische untersuchungen an Strepsipteren. I. Teil. Embryogenesis der gattung Stylops. [Bull. Acad. Polonaise des Sci.] 1927, B: 1093-1226, ill. ***Voss, E.**—Einige weitere Attelabinae und Apoderinae (Curc.). (S). [2] 24: 112-120.

HYMENOPTERA.—*Borgmeier, T.—Um caso de trophobiose entre uma formiga, e um parasita do cafèeiro. (S). [32] 3: 285-289, ill. ***Cockerell, T. D. A.**—Bees collected by Nathan Banks in the vicinity of the Panama Canal. [5] 35: 173-181. **Cockerell, T. D. A.**—III. Bees collected by Dr. W. M. Wheeler at flowers of Triplaris. (S). [5] 35: 170-172. ***Creighton, W. S.**—A new species of Thaumatomyrmex from Cuba. [5] 35: 162-166, ill. **Frison, T. H.**—A contribution to the knowledge of the life history of Bremus bimaculatus. [70] 8: 159-214, ill. Records of bumblebees from Alberta, Canada. (Bremidae.) [4] 60: 236-238. ***Heinrich, G.**—Ctenamblyteles nom. nov. (Ichneum.). [11] 1928: 141. **Johnson, C. W.**—The New England Siricidae or horntails. [Bull. Boston Soc. Nat. Hist.] 1928: 3-7, ill. **Rau, P.**—Modification of the nest-building habits of Polistes. [5] 35: 147-150, ill. The reconstruction of destroyed nests by Polistes wasps. [5] 35: 151-152. Trophallaxis in Polistes pallipes. [5] 35: 153-156.

ELEMENTARY LESSONS ON INSECTS. By JAMES G. NEEDHAM, Professor of Entomology, Cornell University, Ithaca. Charles C. Thomas, publisher. Springfield, Illinois, and Baltimore, Maryland. 1928. 22 x 15.5 cm. pp. viii, 210; 72 figs. Price $2.00, by mail $2.12.—As indicated by the title this book is intended for use by rather immature students who know very little about insects. Its plan embraces, for each topic, first, a description of some insect or group of insects;

second, a "work program" in which pupils as well as teacher participate in the collecting and preparation of material for study; and third, a "laboratory program" of study of both living and preserved specimens. The first topic is "What an insect is like—outside", illustrated by a description of an adult stonefly, followed by directions for gathering, mounting and making balsam slides of the insects used in a comparative study of the exterior of nymph and adult stonefly, grasshopper (nymph and adult), adult dragonfly, beetle and wasp. The second topic is "What an insect is like—inside"; the internal organs of a stonefly nymph again afford the basis of the description, and a comparison of transparent aquatic insect larvae (those of mayfly, dragonfly and midge) comprises the laboratory work. It will be seen that the approach to entomology is made chiefly through aquatic insects instead of such terrestrial forms as cockroach, grasshopper or cricket. Why should there not be many avenues of approach?

The two topics above mentioned, with III, How an insect grows up, constitute Part I, Introductory (pp. 3-36). Part II (pp. 37-136) deals with the Principal groups of insects, Part III (pp. 139-174) with Injurious insects and their control, Part IV with Collecting, preserving and rearing insects (pp. 177-206). There is a list of 22 reference books (p. 206) and an index of 4 pages.

Special features are, as the preface states, "a new selection of material for elementary instruction and some new plans for its use." Very compact are the "Clues for recognition of the commoner orders of winged insects" (p. 135), the "Condensed list of injurious insects" (pp. 151-153) and the list of "Insect enemies of principal crops" (pp. 157-159).

The book is attractively bound and is printed on unglazed paper—with praiseworthy lightness of weight.—P. P. CALVERT.

DESTRUCTIVE AND USEFUL INSECTS by C. L. METCALF and W. P. FLINT. 918 pp., 561 fig., McGraw-Hill Book Co., New York, 1928.

Many who were familiar with the mimeographed issues of 'Destructive and Useful Insects' have awaited the first printed edition impatiently. A cursory examination is sure to leave a good impression with the biologist, and when the book is carefully investigated it is not likely that this credence will be altered. Obviously the authors are capable of accepting the commission of writing such a book as this one proves to be. Mr. Flint has had wide experience in insect control, while Professor Metcalf has been connected with a number of our

leading higher institutions. From this we expect a book of value to both teacher and economic entomologist, and so it is.

The strongest feature of the book is probably the introductory portion, consisting of ten chapters. The chapters following are of equal value, but are less unique. Most books on applied entomology have, perhaps of necessity, slighted the discussion of the relation of insects to mankind, the structure, development, classification and control of insects. Here we find these in great detail, 297 pages in all. Probably for this reason we have no right to call this a book on practical entomology, though that is its general tendency. The introductory chapters alone are sufficient for a small textbook, and many teachers cover no more than this in their beginning course. The order of the first chapters is slightly different from the usual: Insects as Enemies of Man, The Value of Insects to Man, The External Morphology of Insects, The Internal Anatomy and Physiology of Insects, The Mouth Parts of Insects, Development and Metamorphosis, The Place of Insects in the Animal Kingdom, The Order of Insects, Insect Control, and Apparatus for Applying Insecticides. Following these chapters are thirteen on insect pests of the various economic groups of crops, stored products, domestic animals, and man.

Teachers may notice that the discussion of the biological position of insects is delayed until after the chapters on structure and development. After teaching many classes in elementary entomology Professor Metcalf has deemed it wise to give the student a clear idea of what an insect is before he is taught the relationship of insects to the remainder of the animal kingdom. Probably it is also an opportune introduction to the orders and chief families of insects. Useful outlines are frequent, there are a number of well selected quotations from noted entomologists, and references are given. Scientific names and references are given in footnotes, which adds to the clarity of the text.

Each chapter on insect pests opens with a field key for identification, similar to those prepared by Lochhead in his *Economic Entomology,* but more complete. Where accurate figures on depredations and cost of control are available these precede the tables and discussion. A surprising amount of information has been concentrated in these thirteen chapters, yet it is not compacted to the point of being useful only for reference. A small but well selected list of references is given for each insect. It is safe to say that the great majority of the economic pests of America are treated, though of course equal weight is not given to all.

The authors have borrowed freely from many sources, as it is necessary to do in a work covering such broad range. The cuts have been well selected, and many of them are not sufficiently familiar to breed contempt. Special mention is due several drawings by A. M. Paterno, and the figures from the files of the State Natural History Survey at Urbana.

The directness of approach and the lucid style of writing are not the least features of the book. The reviewer has used the mimeographed edition as a reference for his students, who have found it very easy to read. The authors go a little beyond the field of entomology at times, and this will detract nothing from the usefulness of their work. This is shown in the general treatment of taxonomy, in the comparison of the insect body with that of the vertebrate, and in many other places.

A book has never been written that was favorably reviewed by all critics. Here the teacher or field worker will find modifications necessary, but these are due less to mistakes than regional or institutional differences. To the writer of this review the good points are so replete, and those he would change so minor that he hesitates to say anything in this direction. Let the worker decide for himself, he will find the book exceedingly interesting. No pains have been spared by authors or publisher in making this one of the most important books in the McGraw-Hill trade list. Its physical features befit its technical makeup. The actual writing of the book has been in process more than five years, and most of the mistakes have been combed out through the influence of the temporary editions. It will be useful to all entomologists. It gives an unsurpassed short account of the fundamentals of entomology, and should prove a valuable textbook. Its size and consequent expense ($7.50) will prevent its adoption by teachers having a limited time for their elementary course, but it is safe to say that it will take its place beside Comstock's 'Introduction' and Folsom's 'Entomology.' It is not unreasonable to expect it to exceed in use all books on practical general entomology.

PAUL KNIGHT, University of Maryland.

OBITUARY

DR. E. A. SCHWARZ.

Pneumonia, following serious injury from a fall, resulted in the death of Dr. Schwarz in Washington, D. C., on the 15th of October, 1928. As an entomologist few were more broadly known or more highly respected than this kindly man. Few

are there in this country or abroad but knew of him or his works, for though not at all a profuse writer, his extensive knowledge of entomology in general and of Coleoptera in particular exerted an influence felt in one way or another all over the entomological world. Being a classical scholar of Old World training, he knew well several tongues and was able and willing at all times to help less able workers to arrive at the correct meaning of involved Latin phrases or to construct technical names from the Greek and Latin languages. He possessed an intimate knowledge of the biology and taxonomy of the beetles of all faunas, especially of the United States. For years he spent much time in field observations and thus knew his subjects, both at home in nature and pinned in collections. In general, he was a most learned entomologist, but his retiring disposition served to obscure all outward evidence of this, as he studiously shunned publicity. A few words of conversation would, however, serve to reveal an accurate and intimate knowledge of almost any subject and almost invariably shed light on questions under discussion.

Dr. Schwarz was a most kindly man, and a friend to all. More than one professional entomologist owes allegiance to him as the one who long ago encouraged his incipient interests in the study of insects and directed and helped him along the path to professionalism.

The untiring zeal of our late friend was an inspiration to all, and his refusal to relinquish his work until within a few days of his death, at the advanced age of eighty-four, shows to what an extent he was absorbed in his chosen work. A more zealous worker, a more helpful friend, or a more worthy man never lived than good old Dr. Schwarz.

A. N. CAUDELL, U. S. Department of Agriculture.

[Dr. L. O. Howard has contributed a short biographical notice of Dr. Schwarz, with dates and localities, to *Science* for Nov. 9, 1928, page 443, and a longer one from the same pen will appear in the *Proceedings of the Entomological Society of Washington*.—EDITOR.]

ENTOMOLOGICAL NEWS for December, 1928, was mailed at the Philadelphia Post Office on December 17, 1928.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Wanted—Moths of any species of the genus **Apantesis**: also eggs or larvae. Will determine specimens. Want to hear from anyone who will collect in this genus. Dr. E. T. Learned, Fall River, Mass.

Wanted—Names and addresses of collectors in foreign countries, also some second-hand insect cases. Write Mrs. Robert Milde, Lewiston, Minn.

Catopini—Catops (Choleva), Prionochaeta, Ptomaphagus. Wanted to borrow all possible specimens of these genera from North America for a revisional study. Correspondence solicited. Melville H. Hatch, Dept. of Zoology, Univ. of Wash., Seattle, Wash.

Chrysomelidae—Cryptocephalinae and Halticinae—will exchange insects of other orders for above named leaf-bettles. Also many duplicates in other groups of coleoptera.—Paul N. Musgrave, 514 Mt. Vernon Ave., Fairmont, W. Va.

Argynnis of the world wanted by exchange for local Lepidoptera, or by purchase. S. P. Hayes, Jr., Amherst College, Amherst, Mass.

Wanted for cash, Catocala eggs: cara, vidua, obscura, residua, ultronia, retecta, praeclara, amatrix, unijuga, pura, insolabilis, lacrymosa, judith.—E. W. K. Schwarz, 40 W. 84th St., New York City.

Wanted—Lepidoptera, especially Lycaenidae and Hesperiidae, from all localities, in exchange for local Lepidoptera. Harold I. O'Byrne, 501 Pacific Ave., Webster Groves, Missouri.

Wanted—The Linnean Society of New South Wales, whose library is the only one in Australia recorded as receiving "Entomological News," is anxious to obtain a copy of the February, 1927, issue to complete its file. A. B. Walkom, Secretary, 16 College Street, Sydney, Australia.

Exchange—Will exchange California specimens for any of your locality. What have you to offer? Correspondence solicited. John Imschweiler, 748 N. Eucalyptus Ave., Inglewood, California.

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ENTOMOLOGICAL NEWS

VOLUME XXXIX, 1928

CHARLES ROBERT OSTEN SACKEN,
1828–1906

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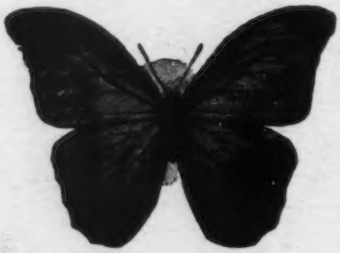

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